

# PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:  
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## PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL SEARCH REPORT AND  
THE WRITTEN OPINION OF THE INTERNATIONAL  
SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Applicant's or agent's file reference 013670-9003-WO00	Date of mailing (day/month/year) <b>28 JUL 2006</b>  <b>FOR FURTHER ACTION</b> See paragraphs 1 and 4 below
International application No. PCT/US04/37932	International filing date (day/month/year) 12 November 2004 (12.11.2004)
Applicant INTEGRATED DNA TECHNOLOGIES, INC.	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

**Filing of amendments and statement under Article 19:**

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

**When?** The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

**Where?** Directly to the International Bureau of WIPO, 34 chemin des Colombettes  
1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 338.82.70.

**For more detailed instructions, see the notes on the accompanying sheet.**

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.
3. ☐ **With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:**
- ☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.
- ☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

**4. Reminders**

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/ US  
Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
Facsimile No. (571) 273-3201

Authorized officer

*Valerie Bell-Harris*  
Fiona T. Powers

Telephone No. 571-272-1600

# PATENT COOPERATION TREATY

# PCT

## INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 013670-9003-W000	<b>FOR FURTHER ACTION</b> <small>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</small>	
International application No. PCT/US04/37932	International filing date ( <i>day/month/year</i> ) 12 November 2004 (12.11.2004)	(Earliest) Priority Date ( <i>day/month/year</i> ) 14 November 2003 (14.11.2003)
Applicant INTEGRATED DNA TECHNOLOGIES, INC.		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the Report**

a. With regard to the **language**, the international search was carried out on the basis of:

- ☒ the international application in the language in which it was filed.  
☐ a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

b. ☒ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box No. II)

3. ☐ **Unity of invention is lacking** (See Box No. III)

4. With regard to the **title**,

- ☒ the text is approved as submitted by the applicant.  
☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

- ☒ the text is approved as submitted by the applicant.  
☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the **drawings**,

- a. the figure of the **drawings** to be published with the abstract is Figure No. \_\_\_\_  
☐ as suggested by the applicant.  
☐ as selected by this Authority, because the applicant failed to suggest a figure.  
☐ as selected by this Authority, because this figure better characterizes the invention.
- b. ☒ none of the figures is to be published with the abstract.

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/37932

## Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:

a. type of material



a sequence listing



table(s) related to the sequence listing

b. format of material



on paper



in electronic form

c. time of filing/furnishing



contained in the international application as filed



filed together with the international application in electronic form



furnished subsequently to this Authority for the purposes of search

2. ☒

In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/37932

## A. CLASSIFICATION OF SUBJECT MATTER

IPC: C09B 29/01( 2006.01);29/08( 2006.01);C12Q 1/68( 2006.01);C07H 21/04( 2006.01)

USPC: 534/727,839;435/6

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 534/727, 839; 435/6

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
CAS ONLINE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3,218,309 A (ELSLAGER et al) 16 November 1965 (16.11.1965), column 8, lines 59-60.	1, 2, 5, 8, 11, 12
X	DE 2,546,535 A1 (HAMPRECHT et al) 28 April 1977 (28.04.1977), Examples 1-17.	1-3, 5, 8, 11-15, 17, 18
X	JP 52-88681 B (MITSUBISHI CHEMICAL INDUSTRIES) 25 July 1977 (25.07.1977), Examples.	1-3, 5, 8, 11, 12
X	JP 52-91031 B (MITSUBISHI CHEMICAL INDUSTRIES) 01 August 1977 (01.08.1977), Examples.	1-3, 5, 8, 11-15, 17, 18
X	HO et al. Azo Polymers for Reversible Optical Storage. 7. The Effect of the Size of the Photochromic Groups, Macromolecules, 1995, Vol 28, No. 18, pages 6124-6127.	1, 2, 5, 8, 11-15, 17, 18

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	"&" document member of the same patent family

Date of the actual completion of the international search

21 April 2006 (21.04.2006)

Date of mailing of the international search report

28 JUL 2006

Name and mailing address of the ISA/US

Mail Stop PCT, Attn: ISA/US  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, Virginia 22313-1450

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Authorized officer

Fiona I. Powers

Telephone No. 571-272-1600

# PATENT COOPERATION TREATY

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:  
TERESA J. WELCH  
MICHAEL BEST & FREIDRICH LLP  
ONE SOUTH PINCKNEY STREET  
PO. BOX 1806  
MADISON, WI 53701-1806

# PCT

WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Applicant's or agent's file reference 013670-9003-WO00		Date of mailing (day/month/year) <b>28 JUL 2006</b>
<b>FOR FURTHER ACTION</b> See paragraph 2 below		
International application No. PCT/US04/37932	International filing date (day/month/year) 12 November 2004 (12.11.2004)	Priority date (day/month/year) 14 November 2003 (14.11.2003)
International Patent Classification (IPC) or both national classification and IPC IPC: <b>C09B 29/01</b> ( 2006.01); <b>29/08</b> ( 2006.01); <b>C12Q 1/68</b> ( 2006.01); <b>C07H 21/04</b> ( 2006.01) USPC: 534/727,839;435/6		
Applicant INTEGRATED DNA TECHNOLOGIES, INC.		

1. This opinion contains indications relating to the following items:

- ☒ Box No. I      Basis of the opinion
- ☐ Box No. II      Priority
- ☐ Box No. III      Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV      Lack of unity of invention
- ☒ Box No. V      Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI      Certain documents cited
- ☐ Box No. VII      Certain defects in the international application
- ☒ Box No. VIII      Certain observations on the international application

## 2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options. see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/ US Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	Date of completion of this opinion 21 April 2006 (21.04.2006)	Authorized officer <i>Valerie Bell-Harris</i> Fiona T. Powers Telephone No. 571-272-1600
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**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US04/37932

**Box No. I Basis of this opinion**

1. With regard to the **language**, this opinion has been established on the basis of:

- ☒ the international application in the language in which it was filed
- ☐ a translation of the international application into \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

- ☒ a sequence listing
- ☐ table(s) related to the sequence listing

b. format of material

- ☒ on paper
- ☒ in electronic form

c. time of filing/furnishing

- ☒ contained in the international application as filed.
- ☒ filed together with the international application in electronic form.
- ☐ furnished subsequently to this Authority for the purposes of search.

3. ☒ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/US04/37932

**Box No. V Reasoned statement under Rule 43 bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Statement

Novelty (N)

Claims 4, 6, 7, 9, 10, 16, 19-41 YES

Claims 1-3, 5, 8, 11-15, 17, 18 NO

Inventive step (IS)

Claims 4, 6, 7, 9, 10, 16, 19-41 YES

Claims 1-3, 5, 8, 11-15, 17, 18 NO

Industrial applicability (IA)

Claims 1-41 YES

Claims NONE NO

2. Citations and explanations:

Please See Continuation Sheet

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.

PCT/US04/37932

**Box No. VIII Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the questions whether the claims are fully supported by the description, are made:

Claims 2, 20 and 21 are objected to under PCT Rule 66.2(a)(v) as lacking clarity under PCT Article 6 because claims 2, 20 and 21 are indefinite for the following reason(s): in claim 2, R is not defined. In claims 20 and 21 CEP is not defined.



WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY

International application No.  
PCT/US04/37932

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

V. 2. Citations and Explanations:

Claims 1 to 3, 5, 8, 11 to 15, 17 and 18 lack novelty under PCT Article 33(2) as being anticipated by Hamprecht et al (DE 2546535) or Japanese Patent 52-91031.

The references disclose the claimed chemical composition of the Formula 1 wherein  $R_2$  is an electron withdrawing group which is halogen,  $NO_2$  or CN and  $R_7$  is a substituted aryl group which is an anilyl group of the Formula 2 where L and L' are linking groups which may be nonreactive and may comprise a hydroxyethyl group in which the hydroxy group may be protected. Note Examples 1-17 of Hamprecht et al. and the examples of JP 52-91031.

Claims 1 to 3, 5, 8, 11 and 12 lack novelty under PCT Article 33(2) as being obvious over Japanese Patent 52-088681.

The reference discloses the claimed chemical composition of the Formula 1 wherein  $R_2$  is an electron withdrawing group which is  $NO_2$  and  $R_7$  is a substituted aryl group which is a naphthyl group. Note the examples.

Claims 1, 2, 5, 8, 11 and 12 lack novelty under PCT Article 33(2) as being obvious over Elslager et al. (US 3218309).

The reference discloses the claimed chemical composition of the Formula 1 wherein at least one of  $R_{1-6}$  is hydrogen and  $R_7$  is a substituted aryl group which is a naphthyl group. Note column 8, lines 59 to 60.

Claims 1, 2, 5, 8, 11 to 15, 17 and 18 lack novelty under PCT Article 33(2) as being obvious over Ho et al.

The reference discloses the claimed chemical composition of the Formula 1 wherein at least one of  $R_{1-6}$  is hydrogen and  $R_7$  is a substituted aryl group which is an anilyl group of the Formula 2 wherein one of L and L' is a nonreactive linking group and the other is a hydroxyethyl group which may be protected. Note pages 6124-6125 NDR1M.

Claims 1 to 3, 5, 8, 11 to 15, 17 and 18 lack an inventive step under PCT Article 33(3) as being obvious over Hamprecht et al (DE 2546535) or Japanese Patent 52-91031.

The references disclose the claimed chemical composition of the Formula 1 wherein  $R_2$  is an electron withdrawing group which is halogen,  $NO_2$  or CN and  $R_7$  is a substituted aryl group which is an anilyl group of the Formula 2 where L and L' are linking groups which may be nonreactive and may comprise a hydroxyethyl group in which the hydroxy group may be protected. Note

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

International application No.  
PCT/US04/37932

**Supplemental Box**

In case the space in any of the preceding boxes is not sufficient.

Examples 1-17 of Hamprecht et al. and the examples of JP 52-91031. One of ordinary skill in the art would have been motivated to make additional compounds useful as dyes by modifying the linking groups of compounds disclosed by the references.

Claims 1 to 3, 5, 8, 11 and 12 lack an inventive step under PCT Article 33(3) as being obvious over Japanese Patent 52-088681.

The reference discloses the claimed chemical composition of the Formula 1 wherein  $R_2$  is an electron withdrawing group which is  $NO_2$  and  $R_7$  is a substituted aryl group which is a naphthyl group. Note the examples. One of ordinary skill in the art would have been motivated to make additional compounds useful as dyes by modifying the linking groups of compounds disclosed by the reference.

Claims 1, 2, 5, 8, 11 and 12 lack an inventive step under PCT Article 33(3) as being obvious over Elslager et al. (US 3218309). The reference discloses the claimed chemical composition of the Formula 1 wherein at least one of  $R_{1-6}$  is hydrogen and  $R_7$  is a substituted aryl group which is a naphthyl group. Note column 8, lines 59 to 60. One of ordinary skill in the art would have been motivated to make additional compounds useful as dyes by modifying the linking groups of compounds disclosed by the reference.

Claims 1, 2, 5, 8, 11 to 15, 17 and 18 lack an inventive step under PCT Article 33(3) as being obvious over Ho et al. The reference discloses the claimed chemical composition of the Formula 1 wherein at least one of  $R_{1-6}$  is hydrogen and  $R_7$  is a substituted aryl group which is an anilyl group of the Formula 2 wherein one of L and L' is a nonreactive linking group and the other is a hydroxyethyl group which may be protected. Note pages 6124-6125 NDR 1M. One of ordinary skill in the art would have been motivated to make additional compounds useful as dyes by modifying the linking groups of compounds disclosed by the reference.

Claims 4, 6, 7, 9, 10, 16 and 19 to 41 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the compositions of the Formula 1 as defined by the claims, the method of hybridizing nucleic acid polymers or the method for synthesizing an oligonucleotide containing a fluorescent quenching composition.

Claims 1 to 41 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.